

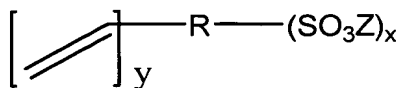
**Amendments to the Claims**

Please cancel Claims 1-15. Please add new Claims 16-35. The Claim Listing below will replace all prior versions of the claims in the application:

**Claim Listing**

1-15 (Cancelled)

16. (New) A proton-conducting electrolyte membrane obtained by a process comprising the steps of:
  - a) swelling a polymer film with a liquid comprising a vinyl-containing sulphonic acid, and
  - b) polymerizing the vinyl-containing sulphonic acid present in the liquid introduced in step a).
17. (New) The membrane of Claim 16, characterized in that the film used in step a) exhibits swelling of at least 3% in the liquid comprising a vinyl-containing sulphonic acid.
18. (New) The membrane of Claim 16, characterized in that the polymers used in step a) are polymers that are stable at high temperatures and contain at least one nitrogen, oxygen, or sulphur atom in one or more repeat units.
19. (New) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains compounds of the formula



wherein

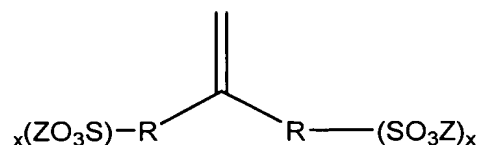
- R represents a bond, a C1-C15 alkyl group, a C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, or NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group,

C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or the formula



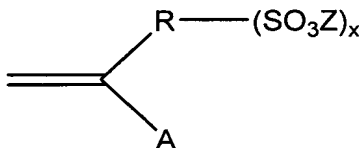
wherein

R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,

Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or the formula

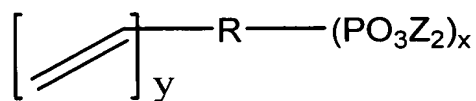


wherein

A represents a group of the formulae COOR<sup>2</sup>, CN, CONR<sup>2</sup><sub>2</sub>, OR<sup>2</sup> and/or R<sup>2</sup>, wherein R<sup>2</sup> represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,

- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN,  $NZ_2$ ,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

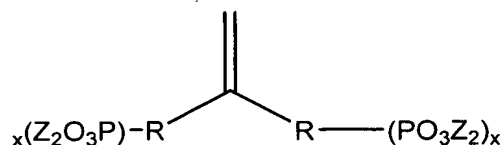
20. (New) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains phosphonic acid.
21. (New) The membrane of Claim 20, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN,  $NZ_2$ ,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

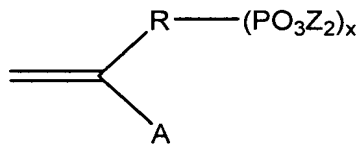
or of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

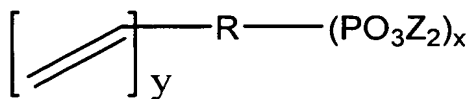
or of the formula



wherein

- A represents a group of the formulae COOR<sup>2</sup>, CN, CONR<sub>2</sub><sup>2</sup>, OR<sup>2</sup> or R<sup>2</sup>, wherein R<sup>2</sup> represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

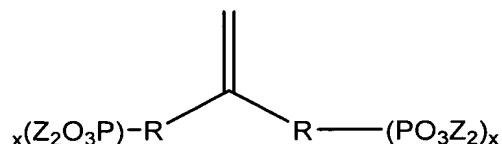
22. (New) The membrane of Claim 20, characterized in that the ratio by weight of vinyl-containing phosphonic acid to vinyl-containing sulphonic acid lies in the range of 1:100 to 99:1.
23. (New) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains monomers capable of crosslinking.
24. (New) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains at least one substance capable of forming radicals.
25. (New) The membrane of Claim 16, characterized in that the polymerization in step b) is carried out by irradiation with IR or NIR light, UV-light,  $\beta$ ,  $\gamma$  and/or electron rays.
26. (New) The method of Claim 16, characterized in that the membrane has inherent conductivity of at least 0.001 S/cm.
27. (New) The membrane of Claim 16, characterized in that the membrane contains between 1 and 90 % by weight of the polymer and between 99 and 0.5 % by weight of polyvinyl sulphonic acid.
28. (New) The membrane of Claim 16, characterized in that the membrane comprises a layer containing a catalytically active component.
29. (New) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains phosphonic acid and compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

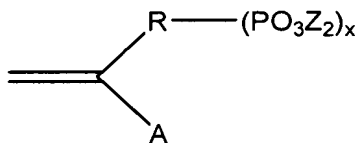
or of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

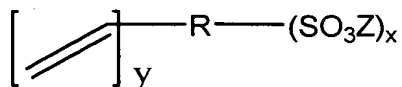
or of the formula



wherein

- A represents a group of the formulae  $\text{COOR}^2$ ,  $\text{CN}$ ,  $\text{CONR}_2^2$ ,  $\text{OR}^2$  or  $\text{R}^2$ , wherein  $\text{R}^2$  represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $-\text{CN}$ , and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10; and
- the ratio by weight of vinyl-containing phosphonic acid to vinyl-containing sulphonic acid lies in the range of 1:100 to 99:1.

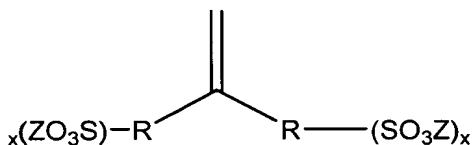
30. (New) A membrane electrode unit containing at least one electrode and at least one proton-conducting electrolyte membrane obtained by a process comprising the steps of:
- swelling a polymer film with a liquid comprising a vinyl-containing sulphonic acid, and
  - polymerizing the vinyl-containing sulphonic acid present in the liquid introduced in step a).
31. (New) The unit of Claim 30, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, a C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, or NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

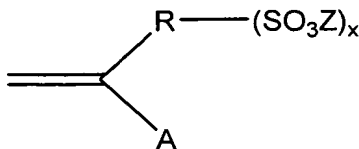
or the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or the formula

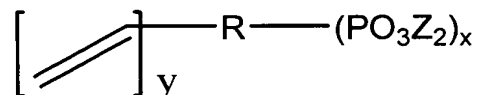


wherein



- A represents a group of the formulae  $\text{COOR}^2$ ,  $\text{CN}$ ,  $\text{CONR}_2^2$ ,  $\text{OR}^2$  and/or  $\text{R}^2$ , wherein  $\text{R}^2$  represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $-\text{CN}$ , and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

32. (New) The membrane of Claim 30, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains compounds of the formula

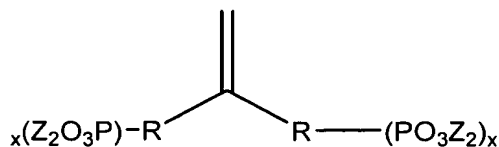


wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $-\text{CN}$ , and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or of the formula

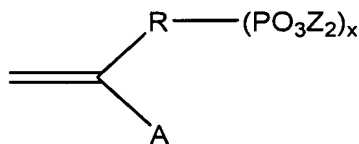
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wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

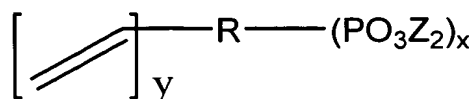
or of the formula



wherein

- A represents a group of the formulae COOR<sup>2</sup>, CN, CONR<sup>2</sup><sub>2</sub>, OR<sup>2</sup> or R<sup>2</sup>, wherein R<sup>2</sup> represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

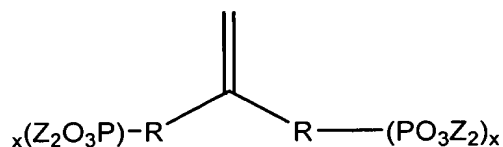
33. (New) The unit of Claim 30, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains phosphonic acid and compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

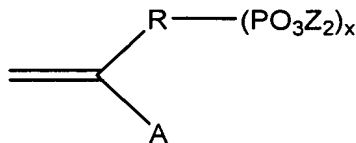
or of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

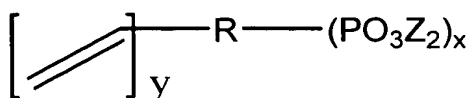
or of the formula



wherein

- A represents a group of the formulae  $\text{COOR}^2$ ,  $\text{CN}$ ,  $\text{CONR}_2^2$ ,  $\text{OR}^2$  or  $\text{R}^2$ , wherein  $\text{R}^2$  represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $\text{COOZ}$ ,  $-\text{CN}$ ,  $\text{NZ}_2$ ,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen,  $-\text{OH}$ ,  $-\text{CN}$ , and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10; and
- the ratio by weight of vinyl-containing phosphonic acid to vinyl-containing sulphonic acid lies in the range of 1:100 to 99:1.

34. (New) A fuel cell containing one or more membrane electrode units containing at least one electrode and at least one proton-conducting electrolyte membrane obtained by a process comprising the steps of:
- swelling a polymer film with a liquid comprising a vinyl-containing sulphonic acid, and
  - polymerizing the vinyl-containing sulphonic acid present in the liquid introduced in step a).
35. (New) The fuel cell of Claim 34, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains phosphonic acid and compounds of the formula



wherein

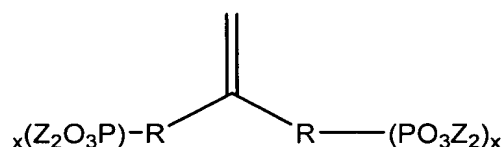
R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,

Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or of the formula



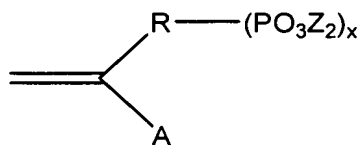
wherein

R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ<sub>2</sub>,

Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or of the formula



wherein

- A represents a group of the formulae  $\text{COOR}^2$ ,  $\text{CN}$ ,  $\text{CONR}^2_2$ ,  $\text{OR}^2$  or  $\text{R}^2$ , wherein  $\text{R}^2$  represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH,  $\text{COOZ}$ , -CN,  $\text{NZ}_2$ ,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, -OH,  $\text{COOZ}$ , -CN,  $\text{NZ}_2$ ,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10; and
- the ratio by weight of vinyl-containing phosphonic acid to vinyl-containing sulphonic acid lies in the range of 1:100 to 99:1.